



STATE OF TENNESSEE  
DEPARTMENT OF HEALTH AND ENVIRONMENT  
EAST TENNESSEE REGIONAL OFFICE  
ALEX B. SHIPLEY REGIONAL HEALTH CENTER  
1522 CHEROKEE TRAIL  
KNOXVILLE, TENNESSEE 37920

November 4, 1983

REPORT OF GEOLOGIC INVESTIGATION

Subject: Knox County, Smoky Mountain Smelters, Inc. - Geologic Evaluation of a Proposed "Industrial Storage Yard."

Date of Visit: August 30, 1983, with Mr. J. P. Crabtree of DSWM and with Mr. Dan E. Johnson representing the applicant.

Location: Quadrangle 147-NW, Knoxville. This site is located about 3 miles south from the center of Knoxville and is on the east side of Maryville Pike (TN 33). A location map is attached.

Property Description: Smoky Mountain Smelters appears to be mainly a reclamation or "resource recovery" operation, reclaiming and processing scrap aluminum into ingots of aluminum or alloys thereof. The subject site is comprised of about 3 acres ( $\pm$ ) which lie adjacent to and southwest of the smelter facility.

The site has the appearance of a dump, containing mostly an impure "salt cake" which has resulted from the processing of aluminum ore. The company is said to be storing this salt cake for eventual reclamation and resale, and company personnel have indicated that the subject area is a storage area and not a disposal facility. However, a very small quantity of demolition-type waste was observed here such as old air conditioner parts, pasteboard cartons, and some assorted wood and metal debris. A rough earthen dike has been placed around the downgradient sides of the amassed salt cake and this seems to effectively control surface drainage away from the area.

No putrescible waste was observed here. Two old (?) settling ponds are situated just to the east of the subject site.

Topography and Drainage: The subject site is on generally low and rolling land which slopes very gently to the southwest. Surface runoff flows generally southwestward to an unnamed and partially intermittent drainway and thence to the Knob Creek embayment of the Fort Loudon Reservoir about 2 miles to the southwest. No streams or springs were observed on the site.

No depressions or sinks were observed on this site.

Geology: This site is underlain by the Ottosee shale which in this area is mainly a brown or grayish silty shale with interbedded calcareous shale. Limestone lenses or beds may occur within the Ottosee but none were apparent at this facility. No bedrock outcrops were observed.

Structurally, this area is situated over the southeast limb of a northeast trending synclinal flexure. The structural setting implies that the bedrock will be jointed; however, there are no surface indications of structural influence. Joints in the shale phases of the Ottosee will tend to be tight and relatively unaffected by solutional weathering.

The Ottosee weathers to a relatively thin, yellowish brown or tan, silty soil which grades progressively into weathered shale and shale bedrock. These soils may have a "chippy" texture due to abundance of small shale fragments. Soil development may be deeper in areas of more intense structural deformation.

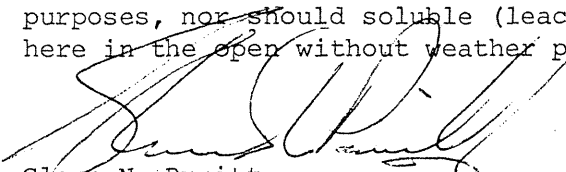
Groundwater Hydrology: Groundwater storage and movement in the shale portions of the Ottosee are restricted to tight joints and bedding planes; however, as the carbonate content increases, the secondary porosity may have been substantially enhanced by solutional activity and the unit may then contain significant amounts of groundwater. Also, in areas of intense deformation, the effects of "crumpling" and shearing may have increased the aquifer potential of the Ottosee. However, with some few exceptions, there are relatively few high yield wells and springs in the Ottosee shale, although there is generally sufficient yield for domestic water supplies.

The Ottosee soils here appear to be somewhat permeable. During periods of heavy rainfall water may percolate fairly rapidly to the more impermeable shale substrate and then flow laterally downgradient to form seeps or "wet weather" springs in nearby drainages.

Conclusions and Recommendations: This site does not have sufficient geologic potential for the disposal of either putrescible or leachable wastes. There appears to be insufficient soil development here to allow for an effectual sorptive buffer above bedrock and/or groundwater. Any leachate occurring here is likely to percolate more or less directly to bedrock, and while some contamination of groundwater would be almost a certainty, there is the eminent probability of lateral seepage and the eventual pollution of surface water.

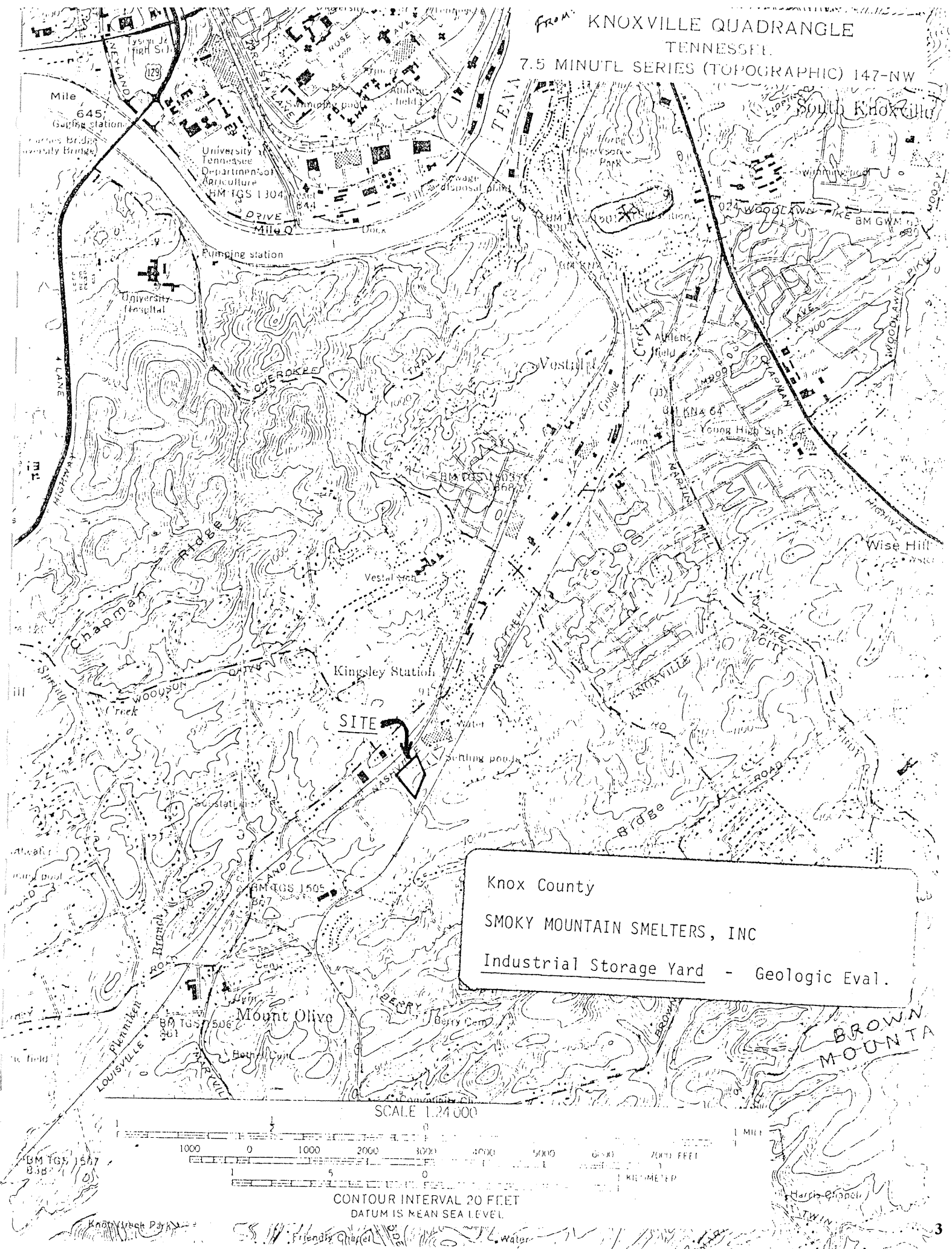
The salt cake material "stored" here appears to consist largely of a relatively soluble substance. There was little evidence of ponding or other water accumulations over the salt cake and runoff from the area seems to have been effectively controlled, therefore rainfall must be seeping or percolating through the salt cake and into the soil-bedrock substrate.

In summary, this site should not be further considered for waste disposal purposes, nor should soluble (leachable) chemical type substances be stored here in the open without weather protection.



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GNP/ekj  
cc: J. Crabtree  
DSWM - Nashville

FROM KNOXVILLE QUADRANGLE  
TENNESSEE  
7.5 MINUTE SERIES (TOPOGRAPHIC) 147-NW

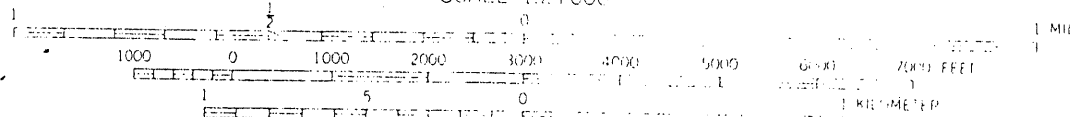


Knox County

SMOKY MOUNTAIN SMELTERS, INC

Industrial Storage Yard - Geologic Eval.

SCALE 1:24,000



CONTOUR INTERVAL 20 FEET  
DATUM IS MEAN SEA LEVEL

GEOLOGY OF THE  
KNOXVILLE QUADRANGLE  
TENNESSEE

AREAL GEOLOGY

Smoky Mountain Smelters, Inc., Knox County

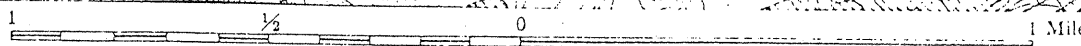
PROPOSED INDUSTRIAL STORAGE YARD

PERTINENT LEGEND

- Oo - Ottosee shale
- Ocr - Chapman Ridge formation
- Oh - Holston formation
- Ol - Lenoir limestone

SITE

SCALE



Contour interval 20 feet  
Datum is mean sea level